

## **PRINTER PORT RE-MAPPING FOR FASTER PRINTING**

### **Background of the Invention**

10 This invention is directed to a system and method for optimized the routing of print jobs. More particularly, this invention is directed to a system and method for optimized routing of print jobs to maximize the printing speed of a network having multiple printer devices by sending the print job to the printer having the smallest print queue.

On a network having multiple printer devices attached thereto, the speed of which a given  
15 print job is printed depends on the total number of jobs and the size of such jobs that are already in the print queue. A print job will be printed in the shortest time only if it is sent to the printer device on the network that currently has the smallest job loading waiting in its queue as compared to other printer devices available to the user. However, such information is generally not readily available to the user. Therefore, the user will generally select a printer device based  
20 on attributes other than the time required to print or the size of the print queue for such printer device. As such, even if the user needs the print job completed quickly, the user may select a printer device with a very large print queue, increasing the time to complete the print job.

It is desirable to have a system and method for optimized routing of print jobs wherein print jobs are routed to the printer device with the smallest print queue.

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### **Summary of the Invention**

In accordance with the present invention, there is provided a system and method for optimized routing of print jobs.

Further, in accordance with the present invention, there is provided a system and method  
30 in which print jobs are routed to the printer device with the smallest print queue.

Further, in accordance with the present invention, there is provided a system and method which facilitates more efficient distribution of print jobs among all the printer devices on a network.

Still further, in accordance with the present invention, there is provided a system for  
35 optimized routing of print jobs comprising queuing means adapted for queuing print job data

5 and means adapted for selectively communicating the print job data to at least one of a plurality of associated printer devices so as to generate a printout therefrom. The system also comprises terminal means adapted for receiving status data from at least one of the plurality of associated printer devices, which status data includes data representative of a commitment level of the at least one associated printer device relative to dominant print job requests and test means adapted  
10 for testing the status data against selected test criteria to determine whether at least one alternative associated printer device is desired for printing. The terminal means also include means adapted for selectively redirecting the print job data from a primary designated associated printer device to a secondary associated printer device in accordance with an output of the test means.

15 Further, in accordance with the present invention, a user inputs pre-authorization to redirect a print job to a selected, alternative printer in the event of a delay in printing from a primary printer. In accordance with another aspect, a user is queued for permission to queue an alternative printer when selected delay criteria have been met relating to a primary printer selection. In this event, a user may accept the alternative printer, or reaffirm the instructions to  
20 queue to the primary printer notwithstanding the delay.

Still further, in accordance with the present invention, there is provided a method for optimized routing of print jobs comprising the steps of queuing print job data and selectively communicating the print job data to at least one of a plurality of associated printer devices so as to generate a printout therefrom. The method also comprises receiving status data from at least  
25 one of the plurality of associated printer devices, which status data includes data representative of a commitment level of the at least one associated printer device relative to dominant print job requests and testing the status data against selected test criteria to determine whether at least one alternative associated printer device is desired for printing. The method further comprises selectively redirecting the print job data from a primary designated associated printer device to a  
30 secondary associated printer device in accordance with an output of the test means.

In a preferred embodiment, the test criteria includes data representative of a commitment level of the at least one alternate associated printer device. In a more preferred embodiment, the print job data is selectively redirected to the secondary associated printer device which has the lowest commitment level.

5 In one embodiment, the system and method automatically route the print job data to another printer device without user intervention. In another embodiment, a manual mode, the user selects the printer device in which to route the print job.

These and other aspects, features, and advantages of the present invention will be understood by one skilled in the art upon reading and understanding the specification.

### 10 **Brief Description of the Drawings**

Figure 1 is a block diagram depicting an exemplary network configured to deploy the method and implementation of the present invention.

Figure 2 is a flow chart illustrating the method according to the present invention.

### 15 **Detailed Description of the Preferred Embodiments**

This invention is directed to a system and method for optimized routing of print jobs. Preferably, the system and method maximize printing speed on a network having multiple printers by sending a print job to the printer with the smallest job queue. The system and method re-map the printer port to the printer device having the smallest queue, avoiding those printers with long waits before printing. The system and method use three software components, a graphical user interface, a search dynamic link library and a mapping dynamic link library. Capable of operating in automatic mode, without the graphical user interface, or in manual mode with the graphical user interface, the system and method search the printer devices attached to the network, determining the printer device having the smallest total job size. In automatic mode, the search dynamic link library will select the printer device with the smallest total job size and the mapping dynamic link library will then re-map the printer port to that printer device with the smallest queue. In manual mode, a user selects the printer device from a listing displaying all printer devices found by the search dynamic link library and their respective sizes. The mapping dynamic link library will then re-map the printer port to the user selected printer device.

30 Although discussed with reference to printer devices and print jobs, the system and method of the present invention is suitable for any image generating device and imaging job to optimize routing of the imaging jobs to the image generating device on the network available and having the smallest queue.

5           An exemplary network 100 is shown in Figure 1 for deploying the method and implementation of the present invention. One or more client machines, as illustrated by two machines 102 and 104, send print job requests which are received and responded to by controller/server 106. A suitable client machine is any suitable networked computer or data terminal as will be appreciated by one of ordinary skill in the art. In creating the print job request, the user selected a printer device for printing the print job. The controller governs  
10           access to the printer devices 108, 110, 112 attached to the network. Preferably, the controller then routes the print job to the printer device having the smallest print queue. This printer device is either selected automatically or manually by the user. The print job is sent to the specified printer. The specified printer device receives the print job request and adds the print job to its  
15           print queue. Preferably, the print jobs are printed in the order they are received by the printer device.

          In one embodiment an associated user inputs pre-authorization to redirect a print job to a selected, alternative printer in the event of a delay in printing from a primary printer. The user is queued for permission to queue an alternative printer when selected delay criteria have been met  
20           relating to a primary printer selection. In this event, a user may accept the alternative printer, or reaffirm the instructions to queue to the primary printer notwithstanding the delay.

          Figure 2 shows a flow chart 200 illustrating the method according to the present invention. At 202, a determination is made whether the system is in automatic mode or manual mode. The automatic or manual mode is selected by the user by any suitable means.

25           If the system is in automatic mode, then the flow proceeds to 204 wherein the system starts printing the print job by any suitable means. Flow then proceeds to 206 wherein the search dynamic link library searches for printer devices immediately after the print job is started. The search dynamic link library searches the network for all the printer devices that are online or available for printing. In a preferred embodiment, the search dynamic link library is configured  
30           to only search the local subnet or search within a specified TCP/IP range. The search dynamic link library queries each printer device via any suitable means for its commitment level or the total number of print jobs and the size of each job. Preferably, the search dynamic link library queries the printer devices through simple network management protocol. The printer devices respond with the requested information via any suitable means.

5 Flow then proceeds to 208 wherein the mapping dynamic link library routes the print job to a suitable printer device for the print job via any suitable means. Preferably, the print job is routed to the printer device with the lowest commitment level or the smallest total job size in its print job queue. Flow then proceeds to 210 wherein the print job is spooled to the selected printer device and printed.

10 If it is determined that the system is in manual mode, flow proceeds to 212 wherein the user evokes the manual mode by any suitable means, such as selecting the Manual button 304 shown in Figure 3. Flow then proceeds to 214 wherein the search dynamic link library searches the network for all the printer devices that are online or available for printing. In a preferred embodiment, the search dynamic link library is configured to only search the local subnet or  
15 search within a specified TCP/IP range. The search dynamic link library queries each printer device via any suitable means for its commitment level or the total number of print jobs and the size of each job. Preferably, the search dynamic link library queries the printer devices through simple network management protocol. The printer devices respond with the requested information via any suitable means.

20 The user may terminate the search process by any suitable means as shown at 216, such as selecting the Cancel button 306 as shown in Figure 3. If the search process is terminated, flow proceeds to 228 wherein the print job is routed to the printer device originally selected by the user. Flow then proceeds to 230 wherein the print job is spooled to the selected printer device and printed.

25 Once the search dynamic link library has queried all the available printer devices, the results are displayed for the user via any suitable means as shown at 218. Preferably, the results are displayed in an order sorted by the total job size of each printer device. The user then selects a printer device by any suitable means as shown at 220. If the user does not select a printer device, then flow proceeds to 222 wherein the process is terminated. If the process is terminated,  
30 flow proceeds to 228 wherein the print job is routed to the printer device originally selected by the user. Flow then proceeds to 230 wherein the print job is spooled to the selected printer device and printed.

If the user selects a printer device, flow proceeds to 224 wherein the mapping dynamic link library routes the print job to a suitable printer device for the print job via any suitable

5 means. Flow then proceeds to 226 wherein the printer device receives the print. Flow then proceeds to 230 wherein the print job is spooled to the selected printer device and printed.

As described hereinabove, the present invention solves many problems associated with previous type methods and implementations. However, it will be appreciated that various changes in the details, materials and arrangements of parts which have been  
10 herein described and illustrated in order to explain the nature of the invention may be made by those skilled in the art within the principle and scope of the invention will be expressed in the appended claims.